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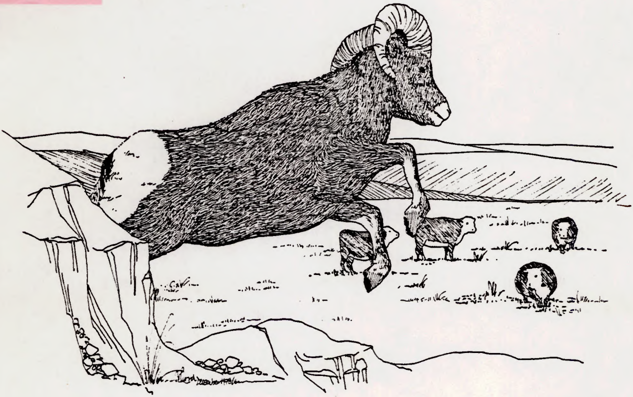
U.S. DEPARTMENT OF THE INTERIOR – BUREAU OF LAND MANAGEMENT

TRICKLE MOUNTAIN
Forage Allocation Research

Report No. 4
Denver Service Center



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PROGRESS REPORT: TRICKLE MOUNTAIN RESEARCH STUDY

Contract No. YA-512-CT8-22

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I. ABSTRACT

This report summarizes work on the Trickle Mountain Research Study (Contract No. YA-512-CT8-22) during April 1, 1979 through September 30, 1979. Field work was continued according to the expanded proposal. An additional 416 ungulate groups, representing about 2500 animals, were observed. Fecal samples were collected at 2-week intervals from the wild ungulates through July 1, and from domestic livestock on each allotment for the entire period. Forage production data were collected using SVIM on 143 transects. Forage utilization on critical bighorn sheep winter/spring ranges is being measured using the "range cage" method. Analysis of livestock food habits data from 1978 indicates both horses and cattle were eating primarily grasses and grasslike species. However, horses were consuming an average of 25% winterfat (Ceratoides lanata). Cattle diets varied significantly and consistently among allotments.

II. OBJECTIVES

A. Overall Program Objectives:

To determine use of and competition for forage by livestock, mule deer, elk, antelope and bighorn sheep by habitat types and seasons in the Trickle Mountain Wildlife Habitat Area and to identify opportunities for habitat improvement and management.

B. Specific Study Objectives:

1.) Determine forage use by mule deer, elk, antelope, bighorn sheep and domestic livestock by habitat sites and season in the Trickle Mountain Area. Determine diet overlap and potential for competition. Determine gross forage carrying capacity for all ungulates.

2.) Develop a model that will define alternative forage allocations for big game and livestock from the above data.

3.) Propose potential habitat improvements and management that will produce alternative carrying capacities for big game and livestock simultaneous with ecosystem integrity and environmental quality based on information obtained during the study. These will include, but not be limited to:

- a.) vegetation manipulation
- b.) controlled burning
- c.) fencing
- d.) seeding and planting
- e.) livestock grazing systems; and
- f.) big game harvest, trapping and transplanting

III. PROCEDURES

A. General

This report summarizes work done on the project from April 1, 1979 through September 30, 1979.

Field work on the project was continued according to the extended proposal, i.e. food habits and distribution data on wild ungulates were collected through June 30, 1979, food habits data on livestock were collected for the entire grazing season, and SVIM data were collected during May through August.

Scott McCollough was stationed in Saguache during the entire period and was working full time in the field. A field crew of C.S.U. students was hired to conduct a SVIM inventory from May through August under the supervision of Scott Hoover. Members of this crew were Kim Foiles, Gary Glueckert, Mark Masteller, and Becky Trentlage. In addition, Martha Cerny, Henry DuFour, Gary Glueckert, Ed Rodriguez, and Becky Trentlage have been working part time since August on data preparation, data analysis, and literature review. Allen Cooperrider has been working on modelling data analysis and literature review for the entire period.

In addition to serving as SVIM crew boss, Scott Hoover designed and carried out a study to characterize pronghorn fawning sites. Some of his data and results are included in this report.

B. Data Collection

1.) Habitat Use. From April through September 30, 1979 an additional 416 observations of groups of wild ungulates were made. This represents approximately 2500 individual animals (including duplications). For each observation, data on time, location, selected weather variables, and activity were recorded. Bighorn sheep observations include sex and age classification. Cattle observations, made from June 1 to September 30, included data on date, location, and number in each group.

Characteristics of foraging areas (vegetation type, slope, aspect, and distance to water) of both cattle and bighorn were recorded. These data will be used to detect any overlap in habitat preferences, which would indicate a potential for competition. Additional sheep escape cover was characterized. These descriptions will provide criteria for identifying any potential, but unused, bighorn habitat. Distances from foraging bighorns to escape cover were recorded until June 21, the end of the winter/spring period.

Eight pronghorn fawning sites were located during 26 May-19 June. Topography, vegetation and distances to roads, water, and the nearest vegetative type that could conceal a predator were recorded at each site.

2.) Food Habits. Ten fecal samples have been collected from each of the wild ungulate species for each 2-week period from April 1 to July 1. In addition, beginning in May, the start of the grazing season, livestock feces have been collected from each allotment having either cattle or horses. This represents 585 livestock samples (Table 1). An additional five samples were collected from trepass cattle on the Trickle Mountain allotment in early June. All samples were preserved in salt and sent to the Composition Analysis Laboratory at C.S.U.

3.) Snow measurements. Snow depths were recorded at those stations with measurable snow. The last measurement was made April 16. A total of 35 stations were chosen to represent various elevations, slopes, aspects, and vegetative types. The measurements will be used to develop equations to predict snow depths on habitat sites as a function of topography, season and snow depth at the weather station in Saguache.

4.) Forage utilization. Measurement of forage utilization by cattle on 22 areas identified as critical bighorn sheep winter/spring range was initiated using the "range cage" method. A total of 66 cages (3 per area), each protecting a 4.8-square-foot plot, were placed in these critical areas before the grazing season. Unprotected plots were also established near the cages.

5.) Forage Production. SVIM data were collected from 143 transects during May through August. This effort required approximately 15 man-months including travel and training time and cost approximately $12,500 including salary, housing, travel and equipment. This translates into a commitment of approximately 1.5 man-days per transect or $90 per transect at a man-month cost of $840.

C. Data Analysis

1.) Habitat Use. No further analysis of the observation data has been made.

2.) Food Habits. The 1978 food habits data for livestock has been summarized by species, allotment and period.

3.) Forage Production. The SVIM data have not been analyzed due to a delay at the BLM Denver Service Center in getting their analysis system operational and due to the backlog of jobs to be done there. In addition, the forms used for reporting SVIM data have been changed 3 times since the initiation of the Trickle Mountain project. Since, the earlier forms can no longer be accepted by the Service Center, almost all of the field forms have had to be recopied. This has delayed submission of both the field forms and the support forms.

D. Forage Allocation Model

Work on the forage allocation model has continued; a working model is not yet completed, and some of the required input data, particularly data on forage production is not yet available.

IV. RESULTS AND DISCUSSION

Results are now available on spring and summer distribution for 1979 of bighorn sheep, pronghorn antelope, mule deer, elk and cattle. In addition, food habits for livestock for the 1978 grazing season are reported here for the first time.

A. Spring and Summer Distribution, 1979

All four species of wild ungulates were commonly observed from April-June. The number of observations, especially on deer and elk, declined during July-September indicating a probable shift in range use.

Bighorn Sheep. A total of 895 bighorn (including duplication) were observed in 102 observations. Although bighorn sheep were observed occasionally along Middle Creek during late winter, concentrations of animals in this area were not evident until April. Most observations were made near cliffs probably used as lambing grounds. The first lamb was observed on May 25.

Sheep utilized Middle Creek the entire summer but density appeared to decline after mid-July. Lambs were also seen on a cliff at the entrance to Ward Gulch. Pregnant ewes were noted as late as June 13.

Sheep foraged in meadows along Saguache Creek near the Dabney Ranch during April-May. Ewe groups (ewes, lambs, and yearlings), including some marked animals, moved to traditional lambing grounds near Buffalo Pass, arriving on May 10.

Rams older than yearlings were seen only occasionally during this period. Some larger rams were observed on the ridge between Bear Creek and Middle Creek.

Other areas used to some extent by sheep this period were: East Sheep Creek, the cliffs across the highway from the Ward Ranch, and the hills bordering Alkali Basin.

By September, bighorns began reappearing near the cliffs by the Dabney Ranch and along lower Ford Creek. Activities of sheep hunters may have influenced their movements.

Pronghorn Antelope. A total of 564 pronghorn (including duplication) were observed in 161 observations. Group size ranged from 1 to 18. Pronghorn moved from late winter concentration areas in Chico Gulch and around Trickle Mountain to the open benches north of Trickle Mountain. Other areas used in summer included North Park, the North Park bench, and Taylor Canyon. Observations were made near lower Dry Gulch in April only. Distribution remained the same in August-September but the number of observations declined abruptly.

Pronghorn fawning sites were in swales on slopes of less than 10 degrees, usually facing south or east. All sites were in rubber rabbitbrush (Chrysothamnus nauseosus) or in low Douglas rabbitbrush (C. viscidiflorus) where average maximum height of vegetation was 26 cm. While shrub provided concealment for pronghorn fawns, visibility from the sites usually was good. Fawning sites were farther from water sources and from vegetation types that could conceal predators than was expected due to chance ($P < 0.05$). Roads on the study area did not appear to influence pronghorn selection of fawning sites (Table 2). The first fawns were noted June 18.

Mule Deer. A total of 113 groups of deer were seen this period, representing 762 animals (including duplication). Group size ranged from 1 to 40, with a mean of 7. Most observations in April and May were made along Jack's, Middle, and Saguache Creeks. Deer were difficult to locate during June-September. During June, most observations were made along Saguache Creek in sections 30 and 32 T45N R7E, slightly off the study area. Only nine observations, scattered throughout the study area were made during late summer.

Elk. A total of 40 observations, representing 273 elk (including duplication), were made in this period. In April, elk were still utilizing winter ranges around Trickle Mountain. During May-June, elk moved northward into the following drainages: Bear Creek, East Sheep Creek, Antelope Creek, Houghland Gulch, and Jack's Creek. The number of observations dropped sharply in July and no elk were seen in August-September. The July observations were made on Sargents Mesa, near Phantom Creek, and in Findley Gulch. Findley

Gulch is at 8600 ft and the vegetation is primarily pinyon-juniper, an atypical elk summer habitat.

Cattle. A total of 244 groups of cattle (including duplication) were observed during the 1979 grazing season. A distribution, by allotment, is summarized below.

Taylor Canyon. Cattle concentrated along East Pass Creek. They were also distributed somewhat uniformly between the allotment's western boundary and Highway 114. The grazing season ran from May 10 to June 10.

Poison Gulch. The grazing season was June 1 to September 30. During June, cattle were seen in Poison Gulch and along Middle Creek in sections 22 and 27. They moved to Ford Creek in July and remained there the rest of the season.

Laughlin Gulch. Cattle grazed on this allotment from June 16 to October 10. Most observations were made in Dry Gulch and along the allotment's southern boundary.

Trickle Mountain. Cattle were on this allotment from June 16 to October 15. The Antelope Creek and Houghland Gulch areas were heavily utilized for all but the last month of the grazing season. Rains in August filled reservoirs at the entrance to Lone Tree Gulch and allowed temporary use of this area. Scattered observations were made on the benches north of Trickle Mountain.

Cross Creek. Cattle gathered around the accessible portions of Jack's Creek and Cross Creek. Concentrations were also noted near the stock tanks in section 4 T45N R6E. The grazing season was from June 26 to October 1, but no use during most of July was permitted.

Sheep Creek. Most observations were made along East Pass Creek and Sheep Creek during the September grazing season.

B. Food Habits

Food habits for horses and cattle have been analyzed for the 1978 grazing season.

Horse. Estimates of food habits of domestic horses were obtained from the Poison Gulch allotment from June through August, the entire period when horses are on BLM lands in the study area. Diet of the horses as estimated by fecal analysis is primarily grass throughout the season (Figure 1). (Figures 1 and 2 are scaled for the entire year so that direct comparison can be made with figures for wild ungulates shown in Progress Report No. 3.) The principal grass species were muhlys (*Muhlenbergia* sp.) and blue grama (*Bouteloua gracilis*) averaging 30% and 22% respectively.

Browse was eaten in consistently high quantities throughout the grazing season. The primary browse species eaten was winterfat (*Ceratoides lanata*) which averaged 25% in the diet. Winterfat has been reported in low percentages from the diets of wild horses (Hansen and Clark 1977; Hansen et al. 1977; Hubbard and Hansen 1976; Olsen and Hansen 1977). Fecal samples from wild horses from Utah have been observed to have winterfat in percentages as high as 75% (Richard M. Hansen, personal communication).

Forbs were almost nonexistent in the fecal samples from horses. This low percentage of forbs was also reported for antelope from Trickle Mountain during most seasons of 1978. As discussed for antelope the low percentage may be due to (1) a generally low percentage of forbs available on the range that year, or (2) a systematic underestimation of forbs by the microhistological technique. However, even antelope consumed a much higher percentage of forbs during this period, averaging 35% from June through August. Thus the low percentage may be due to a low preference of horses for forbs. There is very little literature on either food habits or forage preferences of free-ranging domestic horses.

Cattle. Cattle also relied heavily upon grass and grasslike species during the entire grazing season (Figure 2). The most important species in the diet were fescues (Festuca sp.), muhly's (Muhlenbergia sp.), wheatgrasses (Agropyron sp.), blue grama (Bouteloua gracilis), sedges and rushes.

The proportions of various genera in the diets were substantially different among allotments. For example, fecal analysis of cattle on the Trickle Mountain allotment indicated an average of 17% fescue in the diet for the period June 18 through September 23 as opposed to 1% for the Laughlin Gulch allotment for the same period. These allotments are approximately 10 miles apart at a similar elevation. Thus, food habits may be quite site-specific and caution is advised when inferring local food habits from data collected elsewhere.

Browse in cattle diets ranged from 1 to 30%, varying among 2-week periods and allotments. The most important species were winterfat, four-wing saltbush (Atriplex canescens), and sage (Artemisia sp.). Again, there were obvious differences among allotments with winterfat and saltbush reported mostly from the Laughlin Gulch and Poison Gulch allotments, and sage reported primarily from the Trickle Mountain allotment.

V. LITERATURE CITED

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Table 1. Livestock Fecal Collections, Trickle Mountain Study Area May-September, 1979.

Period	Allotment	Number of Samples	
		Cattle	Horses
23 (May 7-20)	Taylor Canyon	15	
	Poison Gulch		15
24 (May 21 - June 3)	Taylor Canyon	15	
	Poison Gulch		15
25 (June 4-17)	Poison Gulch	15	15
	Trickle Mountain	5	
26 (June 18 - July 1)	Laughlin Gulch	15	
	Cross Creek	15	
	Poison Gulch	15	15
	Trickle Mountain	15	
1 (July 2-15)	Laughlin Gulch	15	
	Poison Gulch	15	15
	Trickle Mountain	15	
2 (July 16-29)	Laughlin Gulch	15	
	Poison Gulch	15	15
	Trickle Mountain	15	
3 (July 30-August 12)	Laughlin Gulch	15	
	Poison Gulch	15	15
	Trickle Mountain	15	
4 (August 13-26)	Laughlin Gulch	15	
	Poison Gulch	15	15
	Trickle Mountain	15	
5 (August 27-September 9)	Laughlin Gulch	15	
	Cross Creek	15	
	Poison Gulch	15	15
	Trickle Mountain	15	
	Sheep Creek	15	
6 (September 10-23)	Laughlin Gulch	15	
	Cross Creek	15	
	Poison Gulch	15	15
	Trickle Mountain	15	
	Sheep Creek	15	
	Total	435	150

Table 2. Characteristics of eight pronghorn fawning sites on the Trickle Mountain Study Area, May-June, 1979.

Characteristic	Average
Slope (degrees)	6
Maximum Vegetation Height (cm)	26
Distance to Nearest Road (m)	376
Distance to Nearest Water (m)	1363
Distance to Nearest Cover for Predators (m)	409

Figure 1. Percent relative density of forage classes in fecal samples from domestic horses, Trickle Mountain, Colorado, 1978.

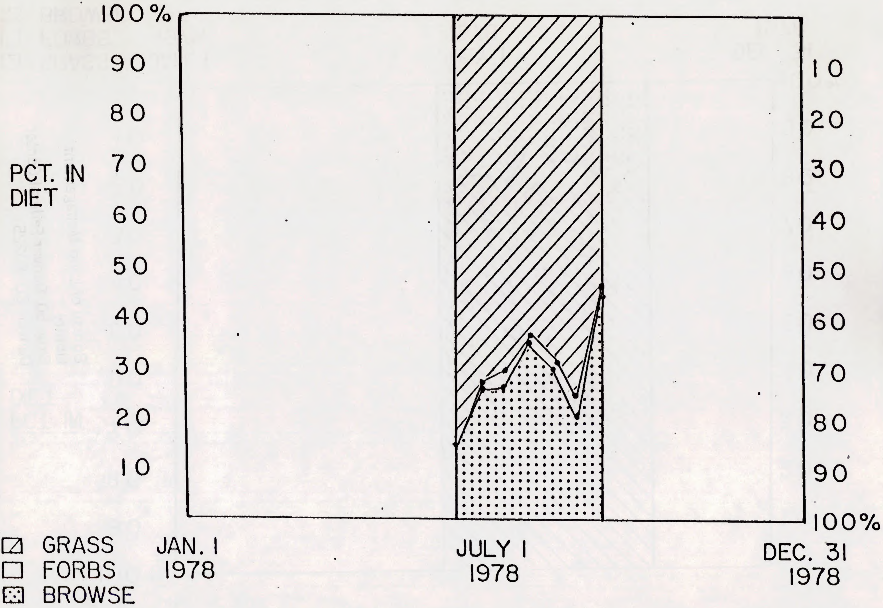
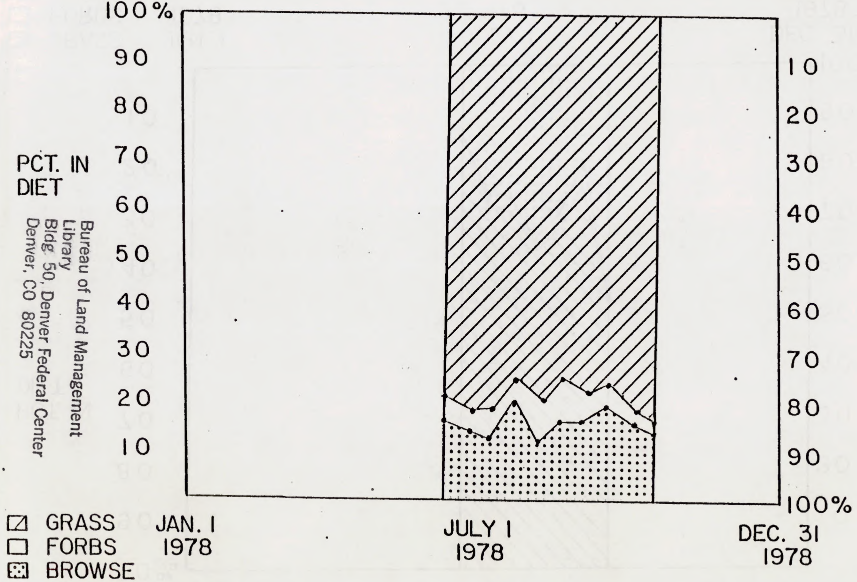


Figure 2. Percent relative density of forage classes in fecal samples from cattle, Trickle Mountain, Colorado, 1978.



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